

WHAT IS CLAIMED IS:

1. A camera comprising:
 - a taking lens;
 - a first focus adjustment section which adjusts a focusing position of the taking lens;
 - a second focus adjustment section which has accuracy lower than that of the first focus adjustment section but which adjusts the focusing position of the taking lens at a high speed;
 - 10 an imaging section which includes an imager to image an object image through the taking lens, and converts an output signal of the imager into image data;
 - 15 a compressibility setting section which sets a compressibility of the image data obtained in the imaging section;
 - 20 a compression section which compresses the image data in accordance with the compressibility set in the compressibility setting section; and
 - 25 a deciding section which decides one of the first focus adjustment section and the second focus adjustment section which is employed to carry out a final focus adjustment operation of the taking lens in accordance with the compressibility set in the compressibility setting section.
2. The camera according to claim 1, wherein the first focus adjustment section adjusts

the focusing position of the taking lens by detecting a contrast change of the image data outputted from the imaging section during movement of the taking lens, and

5 the second focus adjustment section includes a section to output a signal dependent on a distance of an object, and adjusts the focusing position of the taking lens in accordance with an output result of the section.

3. The camera according to claim 1,
10 wherein the deciding section selects the first focus adjustment section when a first compressibility is set by the compressibility setting section, and the second focus adjustment section when a second compressibility smaller in compression rate than the first compressibility is set.
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4. The camera according to claim 1,
wherein the first focus adjustment section carries out a focus adjustment by an imager AF system, and
20 the second focus adjustment section carries out a focus adjustment operation by an external light AF system or a TTL phase difference AF system.

5. A camera comprising:
a taking lens;
an imaging section which includes an imager to
25 image an object image through the taking lens, and converts an output signal of the imager into image data;

a first focus adjustment section which adjusts a focusing position of the taking lens by detecting a contrast change of the image data outputted from the imaging section during movement of the taking lens;

5 a second focus adjustment section which includes a section to output a signal dependent on a distance of an object, and adjusts the focusing position of the taking lens in accordance with an output result of the section;

10 an image processing section which carries out predetermined processing for the image data outputted from the imaging section; and

15 a control section which causes one of the first focus adjustment section and the second focus adjustment section to execute a final focus adjustment operation for the taking lens in accordance with a processing content of the image processing section.

6. The camera according to claim 5,

20 wherein the image processing section includes a section to compress the image data obtained in the imaging section by a predetermined compressibility, and the control section causes one of the focus adjustment sections to execute a final operation based on the compressibility.

25 7. The camera according to claim 5,

wherein the image processing section includes a section to convert the image data obtained in the

imaging section into a predetermined image size, and the control section causes one of the focus adjustment sections to execute a final operation based on the predetermined image size.

5 8. The camera according to claim 5, wherein the image processing section includes a section to carry out edge emphasis processing for the image data obtained in the imaging section, and the control section causes one of the focus adjustment sections to execute a final operation based on presence of the edge emphasis processing.

10 9. A camera comprising:
a taking lens;
an imaging section which includes an imager to image an object image through the taking lens, and converts an output signal of the imager into image data;

15 a compressibility setting section which sets a compressibility of the image data obtained in the imaging section;

20 a compression section which compresses the image data in accordance with the compressibility set in the compressibility setting section;

25 a first focus adjustment section which adjusts a focusing position of the taking lens by detecting a contrast change of the image data outputted from the imaging section during movement of the taking lens;

a second focus adjustment section which includes
a section to output a signal dependent on a distance of
an object, and adjusts the focusing position of the
taking lens in accordance with an output result of the
5 section; and

10 a control section which operates the second focus
adjustment section alone when the compressibility set
in the compressibility setting section is a first
compressibility, and which operates the first focus
adjustment section after the second focus adjustment
section when the compressibility is a second
compressibility lower than the first compressibility.

15 10. A camera comprising:

15 a taking lens;
an imager which images an object image through
the taking lens;

20 an image processing circuit which generates
digital image data from an output of the imager, and
includes a compression circuit to compress the image
data at a compressibility selected from a plurality of
compressibilities;

25 a focus adjustment mechanism which adjusts
a focusing position of the taking lens;

25 a distance measuring circuit which detects
a distance of an object or a focus deviation amount of
the taking lens; and

a CPU which receives the output of the imager and

an output of the distance measuring circuit, controls the focus adjustment mechanism based on the received outputs, and decides a control form of the focus adjustment mechanism in accordance with the 5 compressibility selected by the compression circuit.

11. The camera according to claim 10,
wherein the CPU controls the focus adjustment mechanism based on only the output of the distance measuring circuit when the selected compressibility is 10 a first compressibility, and uses a focus adjustment based on the output of the imager in combination with a focus adjustment based on the output of the distance measuring circuit when the selected compressibility is a second compressibility lower than the first 15 compressibility.

12. The camera according to claim 10,
wherein the CPU has a first control form to control the focus adjustment mechanism based on a contrast value of the image data outputted from the 20 image processing circuit, and a second control form to control the focus adjustment mechanism based on the output of the distance measuring circuit.

13. A camera comprising:
a contrast detection section which detects 25 contrast of an object image signal obtained through a taking lens;
a multipoint distance measuring section which can

range a plurality of points in a photographic screen through a pair of optical systems different from the taking lens;

5 a first focus adjustment section which focuses the taking lens in accordance with a detection result of the contrast detection section;

a second focus adjustment section which focuses the taking lens based on a distance measuring result of the multipoint distance measuring section;

10 a position determination section which determines a position of a main object in the photographing screen from the distance measuring result of the plurality of points; and

15 a selection section which operates the first focus adjustment section when the position determination section determines that the main object is positioned on a center, and which operates the second focus adjustment section when the main object is determined to be positioned on a periphery in the photographing screen.

20 14. A camera comprising:

a first autofocus section which focuses a taking lens based on contrast of an object image signal obtained through the taking lens;

25 a second autofocus section which can range a plurality of points in a photographic screen through a pair of optical systems different from the taking

lens, and focuses the taking lens based on a distance measuring result thereof; and

5 a selection section which preferentially operates the second autofocus section when it is determined from the distance measuring result of the plurality of points that a main object is positioned on a periphery in the photographing screen.

15. A camera comprising:

10 a multipoint distance measuring section which ranges a plurality of points in a photographic screen by using an optical system other than a taking lens to obtain a distance to a main object and a position in the photographing screen;

15 a contrast detection section which obtains an object image through a predetermined taking lens, and detects contrast information of the object image; and

20 a control section which focuses the taking lens based on the contrast information detected by the contrast detection section when the multipoint distance measuring section determines that the main object is positioned on a center of the photographic screen.

16. A camera comprising:

25 a determination section which determines a position of a main object in a photographic screen;

a contrast detection section which obtains an object image through a predetermined taking lens, and detects contrast information of the object image; and

5 a control section which focuses the taking lens based on the contrast information detected by the contrast detection section when the determination section determines that the main object is positioned on a center of the photographic screen.

17. A camera which has a zoom lens in a taking lens, comprising:

10 a multipoint distance measuring section which ranges a plurality of points in a photographic screen by using an optical system different from the taking lens;

15 a contrast focusing section which decides a focusing position based on contrast of a photographing target obtained through the taking lens;

20 a zoom position detection section which detects a zoom position of the taking lens; and

25 a deciding section which decides whether or not to actuate the contrast focusing section in accordance with the zoom position and a result of the multipoint distance measuring.

18. The camera according to claim 17,

25 wherein the deciding section executes focusing without actuating the contrast focusing section when the zoom position is on a wide side and, based on the result of the multipoint distance measuring, a main object position is on a screen periphery.

19. A camera comprising:

a first switch turned ON before photographing, and a second switch turned ON by an operation of a photographing timing;

5 a distance measuring section which measures a distance of an object by an optical system different from a taking lens by a timing of the first switch; and
10 a control section which controls a focusing device based on contrast of an image signal obtained through the taking lens when a timing of operating the first switch and a timing of operating the second switch are different from each other by predetermined time or more, and focuses the taking lens based on an output of the distance measuring section when the timing of operating the first switch and the timing of operating the second switch are less than the predetermined time.

20. A camera which has a focus lock button to execute focus lock control before photographing, comprising:

20 a control section which carries out no focusing based on contrast of an image signal obtained through a predetermined taking lens when the focus lock button is operated, and

25 carries out focusing based on an output result of distance measuring by an optical system different from the taking lens.

21. A camera comprising:

a taking lens;

an imager which images an object image through the taking lens;

an image processing circuit which generates digital image data from an output of the imager;

5 a focus adjustment mechanism which adjusts a focusing position of the taking lens;

a distance measuring optical system;

10 a distance measuring circuit which detects a distance of an object for a plurality of points in a photographing screen through the distance measuring optical system; and

15 a CPU which receives outputs of at least the image processing circuit and the distance measuring circuit, determines a position of a main object from a plurality of distance measuring results outputted from the distance measuring circuit, and decides a control method of the focus adjustment mechanism in accordance with a result of the determination.

22. The camera according to claim 21,

20 wherein the CPU has a first control form to control the focus adjustment mechanism based on a contrast value of image data outputted from the image processing circuit, and a second control form to control the focus adjustment mechanism based on the output of the distance measuring circuit, and selects 25 one of the control forms in accordance with the position of the main object.

23. The camera according to claim 22,
wherein the CPU selects the first control form
when the main object is positioned on a center of the
photographic screen, and the second control form when
5 the main object is positioned on a periphery of the
photographing screen.

24. A camera comprising:

a first autofocus section which focuses a taking
lens based on contrast of an object image signal
10 obtained through the taking lens;

a second autofocus section which focuses the
taking lens in accordance with an output of a distance
measuring device having a distance measuring optical
system different from the taking lens;

15 a blurring detection section which detects
blurring of the camera; and

a selection section which selects one of the first
autofocus section and the second autofocus section
based on an output of the blurring detection section.

20 25. A camera comprising:

a distance measuring section which executes
distance measuring by obtaining an image signal in
a photographic screen through an optical system other
than a taking lens, and obtains a main object distance
25 and the image signal; and

a control section which determines a blurring
state based on a time change of the image signal

obtained by the distance measuring section, carries out focus control of the taking lens in accordance with a result of the distance measuring when the blurring state is determined, and in accordance with contrast of the object image obtained by the taking lens when no blurring state is determined.

5 26. A distance measuring device comprising:
10 a distance measuring section which obtains an image signal in a photographic screen through an optical system other than a taking lens to carry out distance measuring before photographing, and obtains a main object distance and the image signal;

15 a determination section which determines a blurring state; and
20 a switching section which switches between execution of distance measuring by the distance measuring section based on the blurring state determined by the determination section and execution of distance measuring based on contrast of the object image obtained by the taking lens.

25 27. The device according to claim 26,
 wherein distance measuring is carried out by the distance measuring section when the determination section determines the blurring state and an influence of blurring.

28. The device according to claim 26,
 wherein the determination section determines

blurring based on an output of the distance measuring section.

29. The device according to claim 26,
wherein the determination section determines
5 blurring based on information regarding a focal
distance of the taking lens.

30. A camera which has a zoom lens in a taking
lens, comprising:

10 a distance measuring section which obtains an
object image signal by an optical system different from
the taking lens, and measures a distance of an object;

15 a contrast focusing section which decides a
focusing position based on a contrast change obtained
by an imaging section through the taking lens during
very small driving of the taking lens;

a zoom position detection section which detects
a zoom position of the taking lens; and

20 a deciding section which decides whether or not to
continue the contrast focusing control in accordance
with the zoom position and the image signal by the
distance measuring section.

31. The camera according to claim 30,
wherein the deciding section does not continue the
operation of the contrast focusing section when the
25 zoom position is on a wide side and a time change is
large in the image signal by the distance measuring
section.

32. A distance measuring method of a camera,
comprising:

a first step of focusing a taking lens by a first
autofocus system based on contact of an object image
5 signal obtained through the taking lens;

a second step of focusing the taking lens by
a second autofocus system in accordance with a distance
measuring result of a distance measuring device which
has a pair of optical systems different from the taking
10 lens;

a third step of detecting a change in the image
signal used to enable distance measuring in a
photographic screen of the distance measuring device
during control of the first autofocus system; and

15 a fourth step of selecting focusing by the second
autofocus system when the change of the image signal is
detected.

33. A distance measuring method of a camera,
comprising:

20 a first step of executing first autofocusing to
focus a taking lens based on contact of an object image
signal obtained through the taking lens;

a second step of executing second autofocusing to
focus the taking lens in accordance with a distance
25 measuring result of a distance measuring device
which has a pair of optical systems different from
the taking lens and can execute distance measuring in

a photographic screen by using the image signal; and
a third step of selecting execution or
nonexecution of distance measuring by the second
autofocus system based on a time change in an output of
5 the first autofocusing.

34. A distance measuring method of a camera,
comprising:

10 a first step of obtaining an image signal in a
photographic screen by using an optical system other
than a taking lens to carry out distance measuring
before photographing, and obtaining a main object
distance and the image signal;

15 a second step of determining a blurring state
based on a time change in the image signal obtained by
the distance measuring; and

20 a third step of focusing the taking lens in
accordance with a result of the distance measuring when
a blurring state is determined by the determination
step, and in accordance with contrast of the object
image obtained by the taking lens when no blurring
state is determined.

35. A distance measuring method comprising:

25 a first step of obtaining an image signal in a
photographic screen by using an optical system other
than a taking lens to carry out distance measuring
before photographing, and obtaining a main object
distance and the image signal;

a second step of determining a blurring state; and
a third step of switching between execution of
distance measuring based on the blurring state
determined by the second step and execution of distance
measuring based on contrast of the object image
5 obtained by the taking lens.

36. A camera comprising:
a taking lens;
an imager which images an object image through the
10 taking lens;
an image processing circuit which generates
digital image data from an output of the imager;
a focus adjustment mechanism which adjusts
a focusing position of the taking lens;
15 a distance measuring optical system different from
the taking lens;
a distance measuring circuit which detects a
distance of an object through the distance measuring
optical system, and includes a distance measuring
20 sensor to detect a partial object image in a
photographic screen; and
a CPU which controls the focus adjustment
mechanism based on an output of the imager, determines
a blurring state from an output signal of the distance
25 measuring sensor, and cancels a focus adjustment
operation based on the output of the imager when the
amount of blurring is large.

37. The camera according to claim 36,
wherein the CPU controls the focus adjustment
mechanism based on the output of the distance measuring
sensor in place of the focus adjustment operation based
5 on the output of the imager when the amount of blurring
is large.

38. A camera comprising:
a taking lens;
an imager which images an object image through the
10 taking lens;
an image processing circuit which generates
digital image data from an output of the imager;
a focus adjustment mechanism which adjusts
a focusing position of the taking lens;
15 a distance measuring optical system different from
the taking lens;
a distance measuring circuit which detects a
distance of an object through the distance measuring
optical system, and includes a distance measuring
20 sensor to detect a partial object image in a photo-
graphic screen; and
a CPU which controls the focus adjustment
mechanism to control a focus of the taking lens,
determines presence of blurring based on an output
25 signal of the distance measuring sensor, executes
focus control of the taking lens based on the output
of the imager when no blurring is present, and based

on an output of the distance measuring circuit when blurring is present.

39. A camera comprising:

5 a first autofocus system which focuses a taking lens based on contrast of an object image signal obtained through the taking lens; and

10 a second autofocus section which focuses the taking lens in accordance with a distance measuring result of a distance measuring device having a pair of optical systems different from the taking lens,

15 wherein the distance measuring device can range a plurality of points in a photographic screen, and comprises a selection section which preferentially carries out focusing by the second autofocus system when a main object and other objects are determined to be in a predetermined distance range based on a distance measuring result of the plurality of points.

40. A camera comprising:

20 a first autofocus system which focuses a taking lens based on contrast of an object image signal obtained through the taking lens;

25 a second autofocus section which focuses the taking lens in accordance with a distance measuring result of a distance measuring device having a pair of optical systems different from the taking lens,

wherein the distance measuring section can range a plurality of points in a photographic screen, and

comprises a switching section to carry out distance measuring by switching between the first autofocus system and the second autofocus system.

41. A camera comprising:

5 a multipoint distance measuring section which ranges a plurality of points by using an optical system other than a taking lens to obtain a main object distance and a position in a screen before photographing; and

10 a control section which carries out focus control of the taking lens in accordance with a result of the distance measuring when the multipoint distance measuring section determines that the main object is present at a distance not different from those of other objects, and in accordance with contrast of the object image obtained by the taking lens when the main object is determined to be present at a distance far from the other objects.

15 20 42. A camera which has a zoom lens in a taking lens, comprising:

a multipoint distance measuring section which measures distances of a plurality of points in a screen by an optical system different from the taking lens;

25 a contrast focusing section which decides a focusing position based on contrast of an imaging section obtained through the taking lens;

a zoom position detection section which detects

a zoom position of the taking lens; and

5 a deciding section which decides whether or not to actuate the contrast focusing control in accordance with the zoom position and a relation between a main object and a background based on a result of the multipoint distance measuring section.

43. The camera according to claim 42,

10 wherein the deciding section does not actuate the contrast focusing section even when the zoom position is on a wide side and a distance of the main object and a distance of the background are different from each other based on a result of the multipoint distance measuring, and carries out focusing based on the result of the multipoint distance measuring.

15 44. A camera comprising:

a first autofocus system which focuses a taking lens based on contrast of an object image signal obtained through the taking lens; and

20 a second autofocus section which focuses the taking lens in accordance with a distance measuring result of a distance measuring device having a pair of optical systems different from the taking lens,

25 wherein the distance measuring device can range a plurality of points in accordance with image signals of the plurality of points in a photographic screen, and

comprises a differentiation section to obtain differentiation data of the image signals, and

a selection section which preferentially carries out focusing by the second autofocus system when the differentiation information is higher than a predetermined level.

5 45. A camera comprising:

a first autofocus system which focuses a taking lens based on contrast of an object image signal obtained through the taking lens;

10 a second autofocus section which focuses the taking lens in accordance with a distance measuring result of a distance measuring device having a pair of optical systems different from the taking lens,

15 wherein the distance measuring section can range a plurality of points in accordance with image signals of the plurality of points in a photographic screen, and

comprises a determination section to detect contrast information in the photographic screen, and to determine a size of the contrast, and

20 a switching section to switch between the first autofocus system and the second autofocus system based on a result of the determination section.

46. The camera according to claim 45,

wherein the determination section determines the contrast in the photographic screen based on an output 25 of the first autofocus system.

47. The camera according to claim 45,

further comprising a photometry section which

divides the photographic screen into a plurality of areas, and carries out brightness photometry for each area,

5 wherein the determination section determines the contrast in the photographic screen based on photometry information of the plurality of areas by the photometry section.

48. A distance measuring method of a camera which has a zoom lens in a taking lens, comprising:

10 a first step of executing multipoint distance measuring to measure distances of a plurality of points in a screen by an optical system different from the taking lens;

15 a second step of deciding a focusing position based on contrast of a photographed image obtained through the taking lens;

a third step of detecting a zoom position of the taking lens; and

20 a fourth step of deciding whether or not to actuate contrast focusing to decide the focusing position based on the zoom position and a relation between distances of a main object and a background in accordance with a result of the multipoint distance measuring.

25 49. The distance measuring method according to claim 48,

wherein the fourth step of deciding the actuation

does not actuate the contrast focusing even when the zoom position is on a wide side, and the distances of the main object and the background are different from each other based on a result of the multipoint distance measuring, and executes focusing based on the result of the multipoint distance measuring.

5 50. A distance measuring method of a camera, comprising:

10 a step of focusing a taking lens by a first autofocus system based on contact of an object image signal obtained through the taking lens;

15 a step of focusing the taking lens by a second autofocus system in accordance with a distance measuring result of a distance measuring device which has a pair of optical systems different from the taking lens, and which can range a plurality of points in accordance with image signals of the plurality of points in a photographic screen;

20 a step of obtaining differentiation information of the image signals; and

a step of making selection to preferentially execute focusing by the third autofocus system when the differentiation information is higher than a predetermined level.

25 51. A distance measuring method of a camera, comprising:

a step of focusing a taking lens by a first

autofocus system based on contrast of an object image signal obtained through the taking lens;

5 a step of focusing the taking lens by a second autofocus system in accordance with a distance measuring result of a distance measuring device which has a pair of optical systems different from the taking lens, and which can range a plurality of points in accordance with image signals of the plurality of points in a photographic screen;

10 a step of detecting contrast information in the photographic screen, and determining a size of the contrast; and

15 a step of switching between the first autofocus system and the second autofocus system based on a result of the determination.

52. A camera comprising:

a taking lens;

an imager which images an object image through the taking lens;

20 an image processing circuit which generates digital image data from an output of the imager;

a focus adjustment mechanism which adjusts a focusing position of the taking lens;

a distance measuring optical system;

25 a distance measuring circuit which detects a distance of an object for a plurality of points in a photographic screen; and

a CPU which receives outputs of at least the image processing circuit and the distance measuring circuit, and controls the focus adjustment mechanism based on the received outputs, determines a distance relation between a main object position and a background from a plurality of distance measuring results outputted from the distance measuring circuit, and decides a control method of the focus adjustment mechanism in accordance with a result of the determination.

10 53. The camera according to claim 52,
 wherein the control method by the CPU includes
 a first control method which controls the focus
 adjustment mechanism based on a contrast value of image
 data outputted from the image processing circuit, and
15 a second control method which controls the focus
 adjustment mechanism based on an output of the distance
 measuring circuit.

20 54. The camera according to claim 52,
 wherein the CPU controls the focus adjustment
 mechanism based on a contrast value of image data
 outputted from the image processing circuit when
 a difference between the main object distance and
 a distance of another object is large, and based on
 an output of the distance measuring circuit when the
25 difference is small.